Supporting Information for

Distinct response of Asian summer monsoon due to black carbon aerosols and greenhouse gases

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Introduction

This supporting information provides additional figures (Figure S1 to Figure S4) to aid in the understanding of the main article.
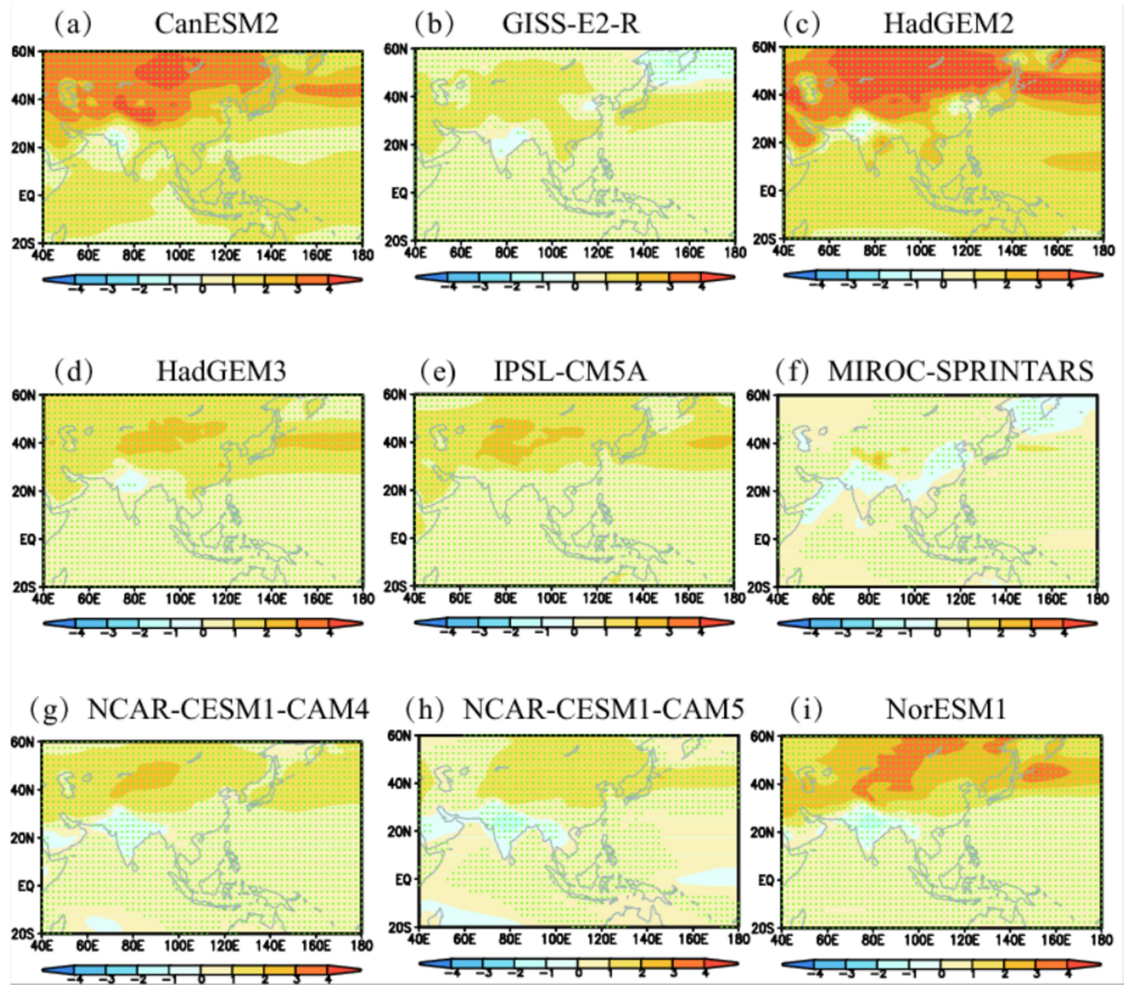
Figure S1, Changes in MJJAS surface atmospheric temperature at 2m (^{o}C) for individual models under increasing BC. Dotted regions indicate represent the grid points where the changes pass the two-tailed t test at the 5% significance level.
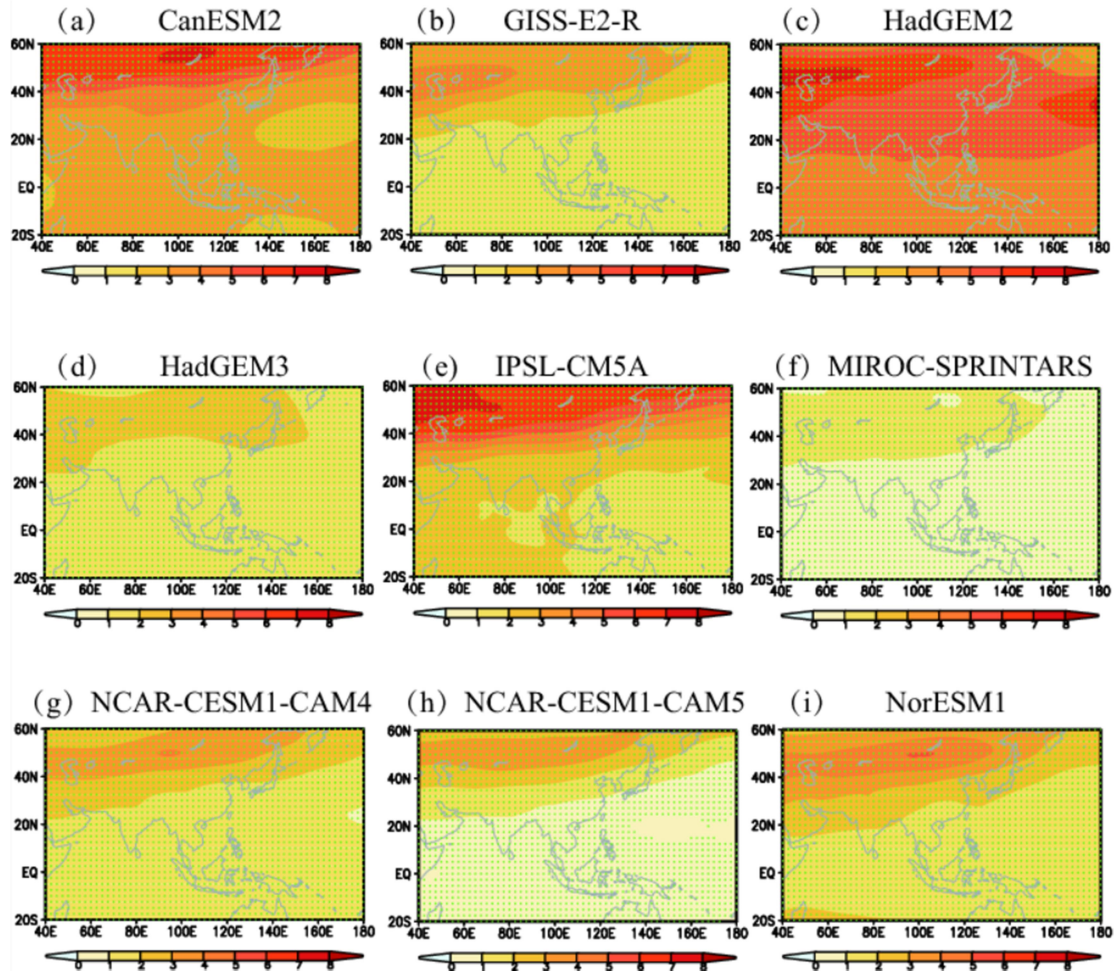
Figure S2, Changes in MJJAS 200 hPa atmospheric temperature (^{o}C) for individual models under increasing BC. Dotted regions indicate represent the grid points where the changes pass the two-tailed t test at the 5% significance level.
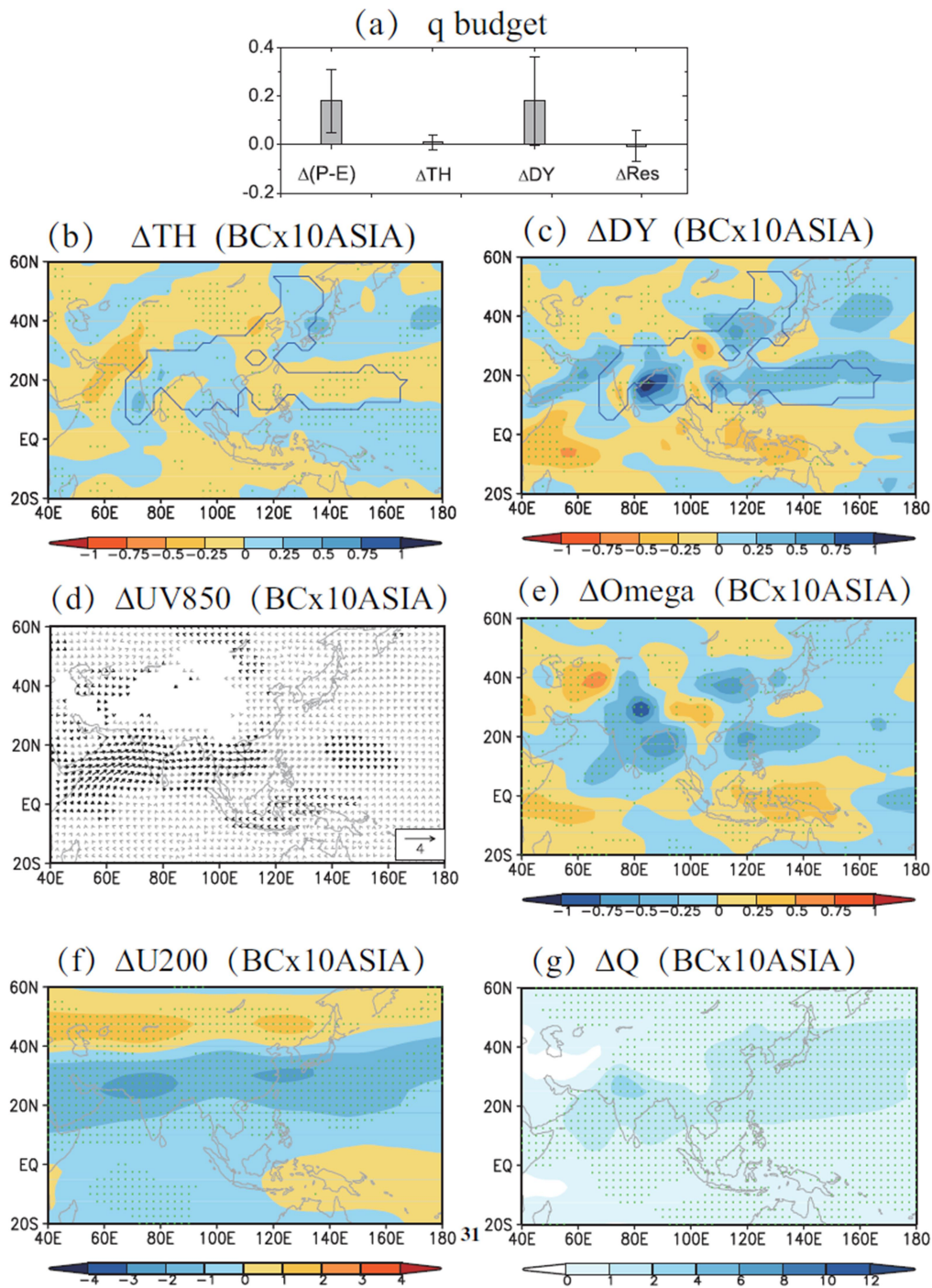
Figure S3, (a), MJJAS domain-averaged changes (mm day^{-1}) in multi-model mean (MMM) precipitation minus evaporation ($\triangle$(P-E)), the thermodynamic term ($\triangle$TH), the dynamic term ($\triangle$DY), and residual term ($\triangle$Res) of moisture budget equation under increasing Asian black carbon. (b) Spatial distribution of MMM MJJAS $\triangle$TH, (c) $\triangle$DY, (d) 850 hPa wind field ($\triangle$UV850, m s^{-1}), (e) 500 hPa vertical velocity ($\triangle$Omega, 0.01xPa s^{-1}), and (f) vertically integrated water vapor ($\triangle$Q, g m^{-2}) under increasing Asian BC. Error bars (a) of MMM represent the standard deviation. Dotted regions (b, c, e, f, and g) and black arrows (d) indicate where MMM is more than 1 standard deviation away from zero, and the areas (b, c) within the blue line represent the Asian monsoon region.
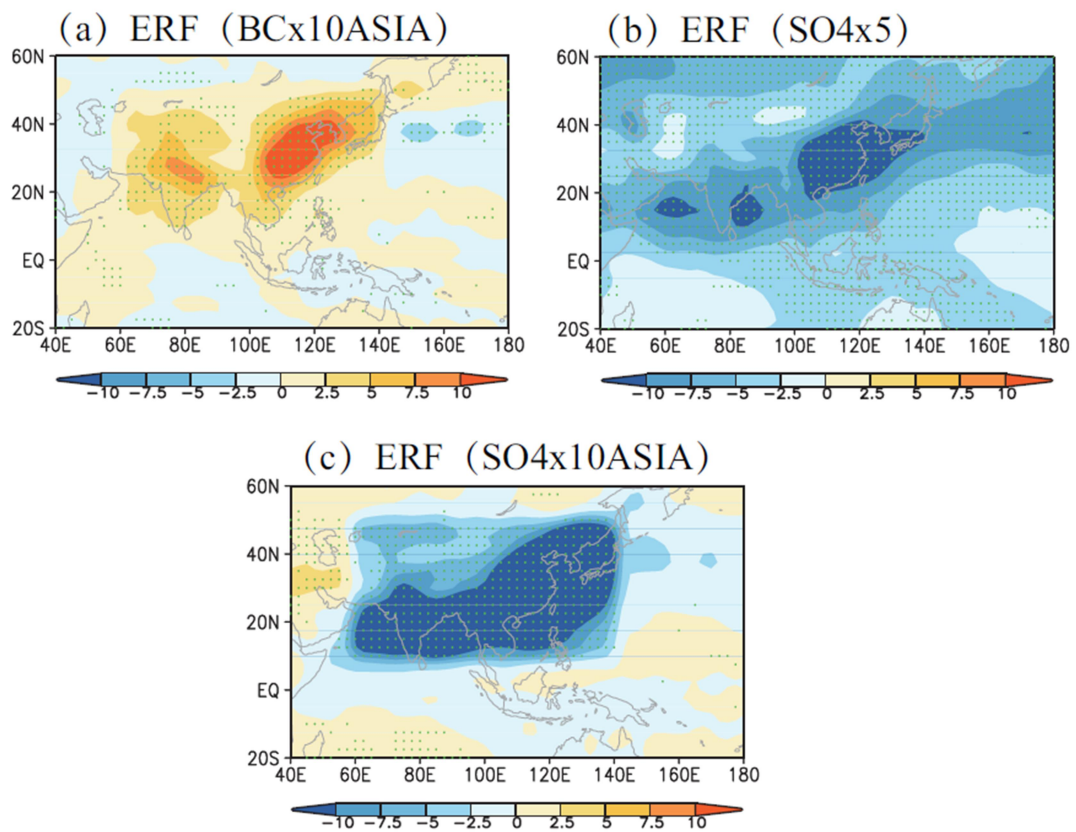
Figure S4, Changes in Multi-model mean (MMM) of MJJAS effective radiative forcing (ERF, W m^{-2}) under (a) increasing Asian BC, (b) global SO4, and (c) Asian SO4. Dotted regions indicate where MMM is more than 1 standard deviation away from zero.